CUTEC News

IN THE SPOTLIGHT: FUEL CELLS

EDITORIAL ON THE ROAD TO THE SUSTAINABLE INDUSTRIAL SOCIETY

Dear Readers,

You are holding in your hands the first newsletter of the New Year. It is also the first newsletter published under the aegis of the new Managing Director. First of all, I would like to take this opportunity to extend my sincere thanks to my predecessor Professor Carlowitz for his dedication and his successful stewardship of CUTEC over a period of 13 years.

The issue which has been foremost in my mind for many years is the sustainable industrial society. We often talk today about the service society and the knowledge society, but the foundation of these models remains the manufacturing-intensive industrial society with its value-added chains. The fact that Germany has such a diverse and highly competitive industrial base is undoubtedly one of the reasons why the country has emerged from the financial crisis relatively unscathed.

However, is the industrial society really sustainable? What have we actually achieved after 40 years of environmental protection and 20 years of sustainability? In end-of-pipe environmental protection, i.e. clean air, effluent treatment and waste disposal, we have had considerable success. However if we then turn our attention to energy and raw material consumption, carbon dioxide emissions and climate change, we reach the sobering conclusion that things are still moving in the wrong direction. We have to admit that we have not yet been able to fully sever the link between affluence / economic growth and resource consumption / environmental impact.

Germany's energy supply is still heavily dependent on fossil fuels. In the medium term, we hope to replace coal, oil and gas by generating electricity and producing substitute raw material from renewable sources and by converting electricity to hydrogen and hydrocarbons. By doing that, the power, heating, transport and industrial sectors can migrate to a renewable base over the long term. Many of the techniques we will need are undoubtedly still in their infancy, but we do know what basic approaches to take.

In addition, we are now using around 90 periodic table elements in our high-tech society. Over the long term, we will have to recycle all of these elements to the maximum extent possible. However current recycling quotas worldwide, especially for the raw materials of "strategic economic importance" (i.e. technology and rare earth metals), are less than 1% in many cases. To make matters worse, no effective recycling techniques are currently available for a number of these elements or the technology that exists is still in its infancy.

Our ability to manage energy and raw material resources will have a crucial impact on the sustainability of the industrial society. The R&D roadmap at CUTEC over the coming years will be derived from this set of challenges. As a Lower Saxony State institution, naturally we have a special sense of commitment to the region and to the State. Our activities however have the international horizon which is needed in a globalised world.

CUTEC can and will make its contribution to the evolution of the sustainable industrial society as we work in partnership with the business, industrial, scientific and government communities and society at large. If we ambitiously push for the necessary changes in the industrial society in Lower Saxony and nationwide, significant opportunities in industrial policy will inevitably arise. Innovative technologies and services directed at responsible energy and resource management will keep us one step ahead in world markets and create secure employment opportunities out into the future.

With all of this in mind, I am looking forward to a fruitful working relationship with you and send my best regards from Clausthal-Zellerfeld.

Yours sincerely,

Martin Faulstich

A PROFILE OF PROF. FAULSTICH

Professor Faulstich, born in1957, is originally from Hagen in Westphalia, so his roots are in the Ruhr Region and he grew up in the midst of mines and metallurgical works. After receiving his technical diploma in secondary education, he went on to obtain an engineering degree from the Düsseldorf University of Applied Sciences. His academic journey continued at RWTH Aachen where he obtained a degree in Mechanical Engineering. After working for an engineering firm, he joined the Department of Environmental Technology at TU Berlin where he worked as a Research Assistant and was awarded his doctorate degree. The title of his thesis was "Reduction Smelting of Residue from Waste Incineration".

In the meantime, Germany East and West had become one nation again and the scientific communities began to converge. In his role as Managing Director of the Waste Management and Resource Stewardship Advocacy Centre at the technology park in Berlin-Adlershof, Professor Faulstich helped a team of people make the transition from what was then the East

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University President Prof. Hanschke (right) welcomes Prof. Faulstich as a new faculty member at Clausthal University of Technology

German Academy of Sciences to the German Federal Institute for Materials Research and Testing. In 1994, he was appointed Professor of Waste Management and Recycling at TUM in Munich. Located at the Garching Campus, his particular emphasis was on waste incineration, slag treatment, sewage sludge, biogas and material flow management.

The traditional metalworking industry remained part of his world. In 2000, he took over as head of the ATZ Development Centre in Sulzbach-Rosenberg (Upper Palatinate), an institution within the remit of the Bavarian Ministry of Economics which carries out trials on materials, raw materials and energy technology. For 12 years, Professor Faulstich remained in charge of the development centre which has its roots in Klöckner steel research at the Maxhütte steel works and then later became part of the Fraunhofer research organisation.

In 2003, he was appointed Chairman of the new Raw Materials and Energy Technology Department at TUM and he was also named the first Director of the Straubing Science Centre. Six Bavarian universities have joined forces at the research Centre which focuses mainly on sustainable energy and renewable resources. Before moving on to Clausthal, Professor Faulstich conducted research for a period of time as a Senior Fellow at the IASS Institute for Advanced Sustainability Studies in Potsdam (Director Prof. Klaus Töpfer) and he is still an active member of the Institute's Electronic Scrap Recycling Working Group.

One career highlight for Professor Faulstich was undoubtedly his appointment to SRU (German Advisory Council on the Environment) by the German Cabinet in 2006. SRU is the oldest national environmental policy body and it has been providing advice to the German government since 1972. He was named SRU Chairman in 2008 and was re-appointed to SRU and re-elected as Chairman in 2012. SRU has been one of the pioneers in the German energy transition.

Professor Faulstich is a Board of Trustees and Advisory Board member at renowned institutions such as the Potsdam Institute for Climate Impact Research and the Ifo Institute of Economic Research. Working on behalf of the Federal Ministry of Education and Research (BMBF), he is Chairman of the Strategic Expert Advisory Committee for the r^2 and r^3 funding programmes (innovative technologies for resource efficiency) and a member of the Advisory Board for the National R&D Programme for resource technologies. He actively supports the State of Lower Saxony in his capacity as a member of the State's European Environmental Policy and Project Planning Commission.

Collaborative research has always been one of his priorities. He has set up and provided leadership for a number of research consortiums and training programmes in fields such as waste management (BayForrest), energy supply (Energie 2030), wear reduction (ForLayer), energy efficiency (ForEta) and the chemical industry (BayReChem 2050). It is hardly surprising that his colleagues elected him as spokesperson representing the Bavarian research consortiums for a number of years. Over the years, Professor Faulstich has received a number of scientific awards. Receiving the 2010 Culture Prize from the city of Sulzbach-Rosenberg was a particularly proud moment for him because he views science as part of the very essence of our culture.

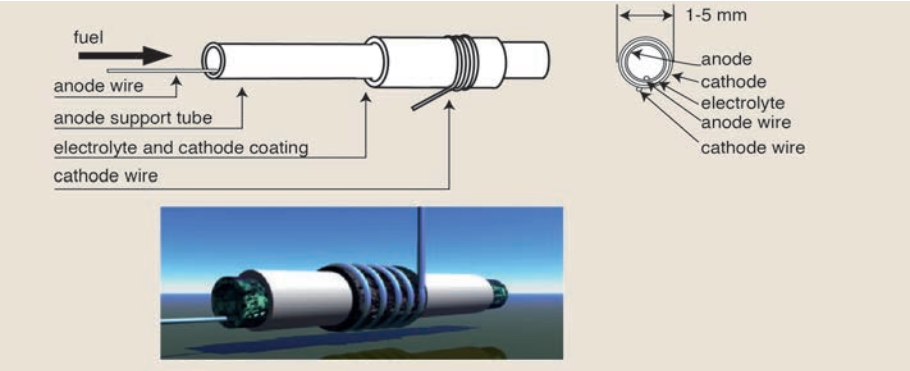
At the beginning of this year, Professor Faulstich took up his new roles as Full Professor of Environmental and Energy Technology at TU Clausthal and CUTEC Managing Director. We wish him all the best and every success in his new position. (he)

SAPIENS:
NEW EU FUEL CELL PROJECT

The EU SOFC Auxiliary Power In Emissions/Noise Solutions (SAPIENS) Project was launched last year on November 1st. As its contribution to the project, CUTEC will develop its own work pathways and provide support to other project partners. The 36-month project will be receiving €1.56 million in EU funding

Under the direction of Adelan Ltd., a University of Birmingham start-up, the consortium partners are planning to develop an on-board electricity supply powered by autogas. The module is based on micro-tubular SOFC fuel cells and is intended for use in motorhomes. It will be mounted into a vehicle made by Auto-Sleepers (Worcestershire, UK) for evaluation.

The research teams will develop, test and optimise 200W stacks of microtubular SOFC fuel cells and subsequently integrate them into a complete fuel desulphurisation, reforming and afterburner system. Using the system in combination with the vehicle battery, camping holiday-makers should have power for up to 14 days without an external power source. In contrast to planar cells, tubular SOFC cells have higher thermal stability. The system starts up faster and is less susceptible to cycling stress. The illustration above shows the schematic representation of a micro-tubular SOFC. The Working Group under Professor Kevin Kendall at the University of Birmingham has been working on this cell technology since 1992 and holds the patents needed for commercialisation. To further enhance the performance capabilities of microtubular cells, SOFC materials supplied by the Austrian firm C.A.R.R.D. (Centre for Abrasives and Refractories Research and Development GmbH) will be used and optimised on the project.



Microtubular SOFC cell made by Adelan Ltd.

Initially, CUTEC will carry out a fuel assessment study based on autogas samples sourced in different European countries, and it will then develop a reforming strategy.

The system design will be based on a process flowsheet simulation carried out by Szczecin University of Technology in Poland. CUTEC will use the specifications derived from the system design to develop the reformer, afterburner and heat exchanger.

The complete system will then be mounted into an Auto-Sleepers motorhome (see illustration below) and put through a series of extensive tests. The European Commission Joint Research Centre in Brussels, Belgium (cell, stack and system testing) and the Catalonia Institute for Energy Research (IREC) in Barcelona, Spain (SOFC cell life testing and lifecycle analysis) are also involved in the project. (di)

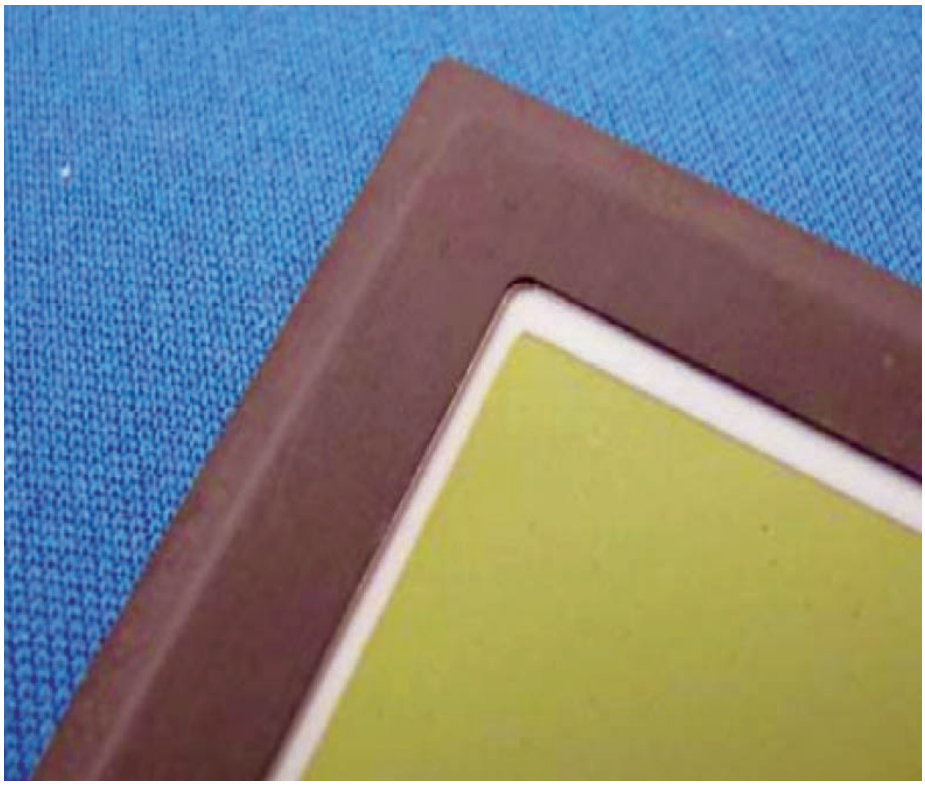
Auto-Sleepers motorhome

SOFC CONFERENCE IN DAYTONA BEACH

The 37th International Conference and Expo on Advanced Ceramics and Composites was held on January 27th – February 1st in Daytona Beach, Florida. One of the sessions was dedicated to the 10th International Symposium on Solid Oxide Fuel Cells (SOFC) which attracted an audience of more than 1,000. The Chemical Process Technology Department gave 3 presentations at the event. Dr. Andreas Lindermeir talked about current results from two fuel cell projects, namely SOFC-Based power generation from Biogas and the Lower Saxony SOFC Research Consortium. Christoph Immisch presented the results achieved so far from work on an SOFC System with anode gas recycling.

Despite the fact that the event was primarily focused on basic research, CUTEC's application-orientated SOFC system development activities generated significant interest and that was reflected in the size of the audience at the presentations. (li)

NEW CONSORTIUM PROJECT FOR THE DEVELOPMENT OF AN INNOVATIVE SOFC STACK DESIGN UNDERWAY



Soldered assembly consisting of a ceramic SOFC cell and metal frame (Photo: ISAF, TUC)

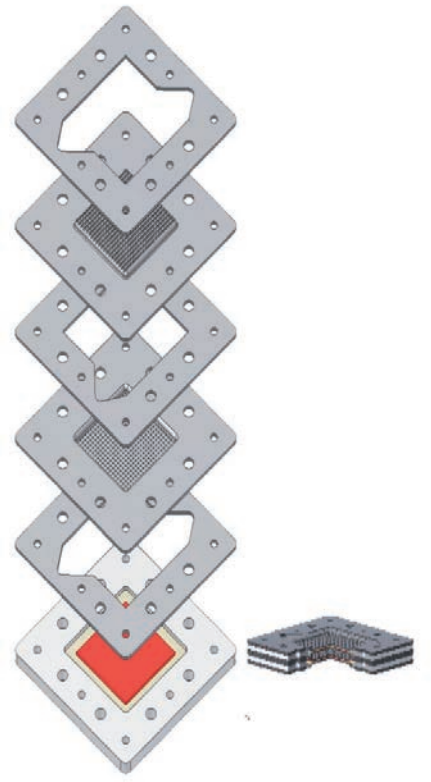
High efficiency and compatibility with a variety of fuels could potentially make high-temperature fuel cells such as SOFCs (Solid Oxide Fuel Cells) an attractive future energy source. Some of the first low to medium power SOFC modules are already commercially available, despite the fact that few suppliers offer stacks in the open market. High production costs, limited service life and degradation still present a major obstacle to market entry.

Because the power output of a single SOFC cell is limited to a few watts, multiple cells have to be connected together to achieve the power ratings needed for real world applications. The cells are normally connected in series. However some of the factors which are involved in stack degradation are directly related to the serial configuration. The electrically insulating glass bonding is unable to withstand the operational stress and does not have sufficient operating life. In particular the high operating temperatures of up to 850°C and the thermo-mechanical stress which is generated during heating and cooling can lead to leakage problems over time. In addition, when the cells are connected in series, the weakest cell becomes the limiting factor for the stack performance.

Rather than connecting the cells in series, over a period of 27 months the CUTEC Institute, the TU Clausthal Metallurgy Institute and the TU Clausthal Welding and Machining Institute (ISAF) want to develop a new stack design with the individual cells connected in parallel. With this configuration, all of the cells automatically operate at the same voltage. Simple, inexpensive detection of a single voltage is sufficient to monitor the operational state of all cells. Operational states that aggravate degradation problems can be detected at an early stage and corrective action can be taken. Also when the cells are connected in parallel, electrical insulation is no longer needed between the individual layers and metal solder can be used for welding/soldering. The first preliminary trials with silver-based solder connections between the cell ceramic and the metal interconnector have already been successfully completed at ISAF. The parallel design also enhances reliability. When the cells are connected in series, the entire stack ceases to function if a single cell develops a fault (“Christmas lights” effect). With the parallel configuration, the only consequence is a reduction in available power.

The intention of the project is to utilise the advantages of parallel circuit design and develop a functional demonstrator stack rated at 200 – 300 W_{el}. Other issues related to the optimal combination of materials, process engineering design and electrical connection also need to be clarified. Production and joining aspects make up another large block on the to-do list.

The project is being conducted under the auspices of the DECHEMA (Society for Chemical Engineering and Biotechnology). The funding through the German Federation of Industrial Research Association’s Joint Industrial R&D Programme (IGF) was approved by resolution in the German Bundestag (IGF Project Number 17598). (li)



Initial draft design for an SOFC with cells electrically connected in parallel

CUTEC TRAINS A NIGERIAN DELEGATION

The training took place from November 26th to December 7th, 2012 and it was the first environmental training block provided under the terms of a consulting agreement signed last year with the government of Niger State. Ten high-ranking technical and management officials from public agencies , ministries and other government institutions travelled to Germany to learn more about Solid Waste Management and Landfill Development. The members of the delegation headed by Permanent Secretary Mr. Ndadanko Kolo from the Niger State Ministry of Water Resources & Environment gathered a wealth of information on the various aspects of waste management, policies and recycling systems in Germany and Europe. Prof. Carlowitz, Dr. Onyeche, Prof. Sievers and Dr. Zeller gave lectures which provided the CUTEC perspective and practical environmental solutions. Mr. Struve from the engineering firm Prof. Hartung + Partner made a special contribution as an external speaker. The 2nd week was dedicated to visits at selected environment and engineering sites. CUTEC International Affairs Coordinator, Dr. Onyeche, took the visitors on a tour of waste management sites in Northern Germany, and a visit to the Nigerian Embassy in Berlin was of course part of the programme . The final highlights during the one-week excursion were a sight-seeing tour in Berlin and a visit to Autostadt in Wolfsburg. During his talk at the closing meeting, the head of the Nigerian delegation stated how pleased he was to have CUTEC is as the environmental consultant to his government. He expressed the hope that the relationship will develop into a long-term intensive partnership. He articulated his admiration for German engineering and environmental awareness and for German culture which he had the opportunity to experience first-hand during the trip. For him personally, it was the first trip to Germany and his first encounter with winter and snow. He then thanked Dr. Onyeche for organising the excellent training and also expressed his appreciation to the CUTEC management team for their magnificent hospitality.

Group photo of the visitors taken in the foyer at the CUTEC-Institut, Germany

The purpose of the 5-year agreement with Niger state government is to provide local environmental engineering and policy consultancy services, the goal being to introduce a sustainable environmental strategy with emphasis on waste management, air pollution monitoring / control and water/waste water and soil remediation. CUTEC is working in partnership with an engineering firm based in Braunschweig (Prof. Hartung + Partner) and Nigerian local companies. Similar training programmes will be provided again in Germany. The next training, which is scheduled for this year, will be dedicated to waste water treatment. (he/on)

EU-GATEWAY PROGRAMME:

CUTEC Visit to Japan

The CUTEC International Affairs Coordinator Dr. Theodore Onyeche took part in a one-week event which was held in Tokyo from February 4th to 8th. The event was organised and funded by the EU. The EU Gateway Programme is directed at SMEs and is intended to help them gain a foothold in the Japanese and Korean markets. The CUTEC Institute has been representing Germany on the EU COST programme (Earth System Science and Environmental Management domain) for 10 years and has been involved in the EU Gateway Programme (Environment & Energy Technology sector) for the past 5 years. CUTEC is the only German Institute in that sector which carries out application-orientated R&D. Nearly 40 companies from many EU countries were selected during the application process. A highly organised programme of activities was scheduled for them. Following an introduction to special aspects of the Japanese market and a tour, an exhibition was held which lasted for two days. Prior to the event, the EU office in Tokyo arranged meetings for European companies with potential Japanese partners. Dr. Onyeche reported that he had ten of these discussions registered for CUTEC stand but about 23 local other companies visited the CUTEC stand. Visitors were interested in renewable energy, thermal treatment of waste, biomass conversion, sewage sludge treatment and the optimisation of sewage treatment plants. The EU Gateway Programme – Japan has produced some very promising contacts for CUTEC, and it is important that such contacts are optimally exploited. (he/on)

FARM SLURRY TREATMENT PROJECT

Farm slurry spreading

With more than 30 million farm animals in Germany and a production value in excess of 10 billion euros, the livestock sector is a major factor in the country's economy. Farm slurry is a by-product of livestock farming. It contains important agricultural nutrients such as nitrogen, phosphorous and potassium and it is normally used as farm fertiliser. Nearly 200 metric tonnes of this farm fertiliser is produced in Germany each year. Most of it is spread as fertiliser on agricultural land near the livestock farms. In some parts of Germany and neighbouring countries, the increasing concentration of farms with large numbers of livestock and a rapid increase in the size of the farms has led to substantial nutrient oversupply which for environmental reasons cannot be (and is not allowed to be) utilised in the immediate region.

While these regions have to manage an oversupply situation, there is demand for these nutrients in other regions. Slurry is 95% water, making the cost of transporting it between regions costly in relation to the nutrient content. So obviously the development of new cost-effective slurry processing techniques to produce slurry concentrate suitable for transport as well as fertiliser which can be stored could be an attractive proposition.

At the end of 2012, the CUTEC Physical and Biological Process Technology Department in collaboration with Dauborn Membransysteme (DMS) started work on a project funded by the Federal Ministry of Economics and Technology to develop innovative technology for concentrating farm slurry and extracting nutrients. The overriding goal is to separate higher-value nutrient fractions as liquid or solid concentrates and water, ideally in a form which can be used as is without additional processing. The intention is to reduce the volume of slurry which needs to be transported by more than 50% and enhance the quality of the water which is separated out so that it can be used for watering or discharged in the local vicinity in an environmentally responsible manner.

DMS will concentrate on the development of corrosion-resistant ceramic membranes and integration of the membranes in an ultra-filtration module based on cross-rotation design. Compared to conventional ultra-filtration systems, the new module will significantly reduce the corrosion and fouling problems which are encountered during farm slurry treatment and it will reduce energy consumption as well. The CUTEC institute will investigate the subsequent treatment of the filtrate and concentrate from the ultra-filtration and reverse osmosis stage. One innovative approach to downstream treatment involves the insertion of a separation unit into the concentrate circulation loop at the reverse osmosis stage for selective recovery of nutrient salts which can be absorbed by plants. The separate development subprojects will then be merged, and a container-size system will be built. The complete system will be optimised during pilot trials. Based on the results, the economic viability of the new farm slurry treatment as well as potential applications will be assessed. (bo)

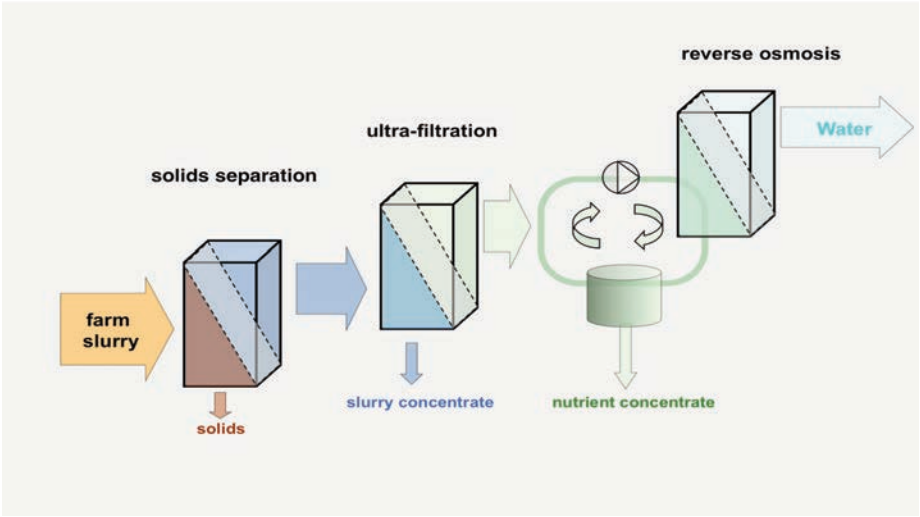


Diagram showing farm slurry treatment

CLAUSTHAL PROCESS AND ENERGY ENGINEERING FIRM (CVET) FOUNDED

The three shareholders who founded CVET (a Clausthal-based process and energy engineering firm) on December 18th, 2012 were formerly part of the Stationary Flue Gas Purification Working Group. While working in the WG, they carried out a number of applications-orientated R&D projects. Building on the previous experience base, CVET is able to combine basic science expertise with operational know-how.

CVET intends to position itself as an engineering consultancy firm specialising in energy technology, providing innovative services and products in the industrial flue gas purification and air pollution control sector. The company's range of services taken as a whole is unparalleled in Germany. Nothing with such a broad base has existed up to this point in Lower Saxony or nationwide.

CVET began business operations on 01/02/13. Besides the three founders, an office assistant and three research assistants are also working at the company. (da)

SCIENTIFIC ADVISORY BOARD:

A Profile of Dr. Jörg Buddenberg

Dr.-Ing. Jörg Buddenberg

Jörg Buddenberg was born in 1959 in Duisburg. After finishing secondary school, he enrolled as a mining student in Clausthal-Zellerfeld. He was awarded a Mining Degree in 1987 and stayed on at the university as a research assistant in the Mining and Mining Business Studies Department. He received his doctorate in 1991 with Prof. Walter Knissel acting as doctoral advisor. His thesis contained a basic investigation of mine layouts and the economic viability of extracting oil from underground mines. He subsequently worked at DEMINEX before moving on to Veba Oil & Gas where he was involved in international crude oil and gas production. His area of responsibility included the assessment of oil & gas reserves as well as business strategy and planning. From 1996 – 1998, he was in charge of a foreign subsidiary in Colombia. In 2000, he left the company to take up the position as Manager of the Strategic Planning and Finance Unit at Jagenberg. One year later, he became the Managing Director of Niedersächsische Energieagentur, an energy consultancy firm based in Hannover. In that capacity, he concentrated on issues related to renewable energy and energy efficiency. Since 2004, Dr. Buddenberg has held a number of different positions at EWE in Oldenburg, initially as head of the Energy and Environmental Engineering Dept. In 2010, he took on the additional role as Managing Director of swb CREA in Bremerhaven which is pressing ahead with wind power generation. In September, he was appointed Co-Managing Director of the newly founded EWE Vertrieb GmbH where he is responsible for the Renewable Energy Business. Since 2007 besides working for EWE, Dr. Buddenberg has been an Associate Lecturer in the TU Clausthal Electrical Power Engineering Department and he is also a member of various committees. He joined the Scientific Advisory Board at CUTEC at the invitation of Prof. Carlowitz. He had made contact with the Institute during the course of several small joint projects on effluent treatment and also through his teaching activities at TU Clausthal in the fossil and renewable energy resource subject area. When asked about what the future holds in store for CUTEC, Dr. Buddenberg said the following: “For me, the future of CUTEC lies in the continuing development of process technology for utilisation of renewable energy. Efficient use of biomass is one of my top priorities, because in my view it holds significant potential as a sustainable resource. Based on my extensive practical experience, I can contribute to the Scientific Advisory Board in an advisory capacity.” (he)

PROF. FAULSTICH TAKES UP ROLE AT EFZN

At its most recent meeting in February 2013, the Executive Board of the Lower Saxony Energy Research Centre (EFZN) asked Prof. Martin Faulstich to join EFZN. EFZN is a scientific institution based in Goslar. It provides a platform where TU Clausthal in collaboration with the Universities of Braunschweig, Göttingen, Hannover and Oldenburg can take a holistic approach to energy. The emphasis is on the entire energy production and utilisation sequence from raw material source to disposal. More than 80 researchers from the world of natural science, engineering, law, social science and economics work there on new fields of research under one roof.

The EFZN Executive Board has seven members. Prof. Hans-Peter Beck from the TU Clausthal Electrical Power Engineering Department is the Board Chairman. An office operating under the direction of Dr. Jens-Peter Springmann provides central support to the Executive Board.

The “energy transition” will bring about fundamental change in the current energy landscape (electricity, heat, transport and industry) in the medium term. That makes it necessary to develop science-based visions of how the energy system will evolve in the medium term. That in turn will necessitate the development of suitable models which can be used to generate credible scenarios in a variety of frameworks. Prof. Faulstich will be in charge of a Systems Analysis and Scenarios Working Group in the Energy Systems and Process Energy Engineering section at EFZN.

EFZN organises the annual Lower Saxony Energy Symposium. The event will take place for the 6th time on October 16th – 17th, 2013 in Goslar. (he)

The EFZN building on the Energy Campus in Goslar

SAYING FAREWELL: PROF. CARLOWITZ STEPS DOWN AS MANAGING DIRECTOR

Prof. Dr.-Ing. Otto Carlowitz

December 19th, 2012 was the day. Accompanied by invited guests and the local press, Prof. Carlowitz said farewell to the staff at a Christmas breakfast after 13 years as head of the Institute. In his brief address, he reflected on his tenure and pointed out that CUTEC is now an established institution in the field of application-orientated R&D. It has an enviable reputation and is regularly able to acquire research projects from high-profile funding institutions. CUTEC also receives significant contract work from the industrial sector. He then expressed his gratitude to the staff for the success achieved in the years he worked with them.

He revealed that he had made the decision not to renew his contract around the time of his 60th birthday and had notified the bodies that needed to know at an early stage. For one thing, he knows that the appointment of a university professor is a lengthy and at times rather opaque process. In addition, he wanted to avoid a situation where a long-term vacancy at the top might interrupt the continued ascent of the Institute. Alluding to the rescue of the CUTEC Institute during a rough period in the early days after Prof. Carlowitz took over as Managing Director in 2000, the two members of the Senior Management Team Dr. Stefan Vodegel and Klaus-Reinhard Sommer presented him with a life-saver. On behalf of the Works Council and the staff, Mrs. Kiefer gave him a premium-quality pen set as a gift. We wish Prof. Carlowitz all the best in his future career. After leaving CUTEC, he will continue to be in charge of the Environmental Sciences Department at TU Clausthal. At the start of the new year, the department moved from CUTEC to TU Clausthal premises and is now located with the Dept. of Energy Process Engineering and Fuel Technology (IEVB) at Agricolastraße 4 in Clausthal.

Werner Grübmeyer (right) extends his congratulations to Prof. Carlowitz on his 60th birthday

Prof. Carlowitz accepts the Land of Ideas initiative award in 2007. (Left: Lower Saxony Minister of Science and Culture Lutz Stratmann, right: Mr. Eggert, Deutsche Bank)

Following in the footsteps of Prof. Leschonski who nurtured the Institute in the 1990's and Prof. Carlowitz who guided the Institute on the road to success in the first decade of the new Century, Prof. Faulstich is now the 3rd process engineering expert to take charge.

NEW ADDITIONS TO THE CUTEC TEAM

Anne Kersten at her workplace

Anne Kersten joined CUTEC on January 2nd, 2013. She completed her training as a Chemical Lab Assistant at the Dr. Heinemann vocational school in Braunschweig. Prior to starting vocational training, she gained valuable experience during her internships at several labs. She is working in the Analysis Department at CUTEC. Through her work, she is supporting research work throughout the Institute.

(wes)

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Published by:
CUTEC Institut
Editor: Dr. T. Heere (he)
Contributors:
Dipl.-Ing. H. Bormann (bo)
Prof. Dr.-Ing. M. Faulstich (fa)
Dr. T. Heere (he)
Dipl.-Ing. K.-H. Dammeyer (da)
Dipl.-Ing. R.-U. Dietrich (di)
Dr.-Ing. A. Lindermeir (li)
Dr.-Ing. T. Onyeche (on)
Dr. T. Zeller (ze)
Layout and typesetting:
G. Wessels (wes)
Production and supply:
CUTEC-Institut GmbH
Leibnizstr. 21+23
38678 Clausthal-Zellerfeld
Phone +49 5323 933-0
Fax +49 5323 933-100
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